04-R-313, Molecular Foundry
Lawrence Berkeley National Laboratory, Berkeley, California

1. Construction Schedule History

	Fiscal Quarter				Total Estimated Cost ($000)	Total Project Cost ($000)
	A-E Work Initiated	A-E Work Completed	Physical Construction Start	Physical Construction Complete		
FY 2004 Budget Request *(Preliminary Estimate)*	3Q2002	1Q2004	2Q2004	2Q2006	$83,700	$85,000

2. Financial Schedule

(dollars in thousands)

Fiscal Year	Appropriations	Obligations	Costs
Project Engineering And Design (PED)			
2002	500	500	38
2003	6,800	6,800	5,972
2004	0	0	1,290
Construction			
2004	35,000	35,000	16,660
2005	32,000	32,000	32,500
2006	9,400	9,400	26,640
2007	0	0	600

3. Project Description, Justification and Scope

The proposed Molecular Foundry at LBNL will be a new structure near the National Center for Electron Microscopy. The project includes an approximately 80,000 gross square foot research building, a separate approximately 5,000 gross square foot utility center, and an initial set of special equipment to support nanoscale scientific research. The research building will be an advanced facility with state-of-the-art clean rooms for the design, modeling, synthesis, processing, fabrication and characterization of novel molecules and nanoscale materials. Space in the new facility will support studies in nanostructures by providing offices and laboratories for materials science, physics, chemistry, biology, and molecular biology. These laboratories, equipped with advanced instrumentation and staffed by full-time, dedicated staff scientists and technicians, will be user facilities, available to scientists from universities, industry, and government laboratories whose research proposals will have been peer reviewed by a Proposal Study Panel. This combination of advanced equipment, collaborative staff, and breadth across disciplines will allow users to explore the frontiers of nanoscience.

The goals and operation of the Molecular Foundry are consistent with DOE guidance and address the research challenges described in the reports *Nanoscale Science, Engineering and Technology Research Directions* and *Complex Systems: Science for the 21st Century.* The Foundry's laboratories will be designed and constructed to facilitate collocation of research activities in a wide variety of fields, as required for progress in this new area of science. The Foundry will support a broad research effort focusing on both "hard" nanomaterials (nanocrystals, tubes, and lithographically patterned structures) and "soft" nanometer-sized materials (polymers, dendrimers, DNA, proteins, and whole cells), as well as design, fabrication, and study of multi-component, complex, functional assemblies of such materials.

By functioning as a "portal" to Lawrence Berkeley National Laboratory's established major user facilities, the Foundry will also leverage existing nanoscience research capabilities at the Advanced Light Source, the National Center for Electron Microscopy, and the National Energy Research Scientific Computing Center. The research program will, as an additional benefit, provide significant educational and training opportunities for students and postdoctoral fellows as the "first true generation" of nanoscientists.

4. Details of Cost Estimate[1]

(dollars in thousands)

	Current Estimate	Previous Estimate
Design Phase		
Preliminary Design & Final Design	4,300	N/A
Design Management costs	1,650	N/A
Total, Design Costs	5,950	N/A
Construction Phase		
Building & Improvements to land	43,300	N/A
Special Equipment[2]	15,300	N/A
Inspection, design and project liaison, check out	1,700	
Construction Management & Project Management	2,150	N/A
Total, Construction Costs	62,450	N/A
Contingencies		
Design Phase	1,330	N/A
Construction Phase	13,970	N/A
Total, Contingencies (18.3% of TEC)	15,300	N/A
Total, Line Item Costs (TEC)	83,700	N/A

5. Method of Performance

An Architect - Engineering firm (AE) with appropriate multi-disciplinary design experience will prepare a building program and design criteria with the support of the LBNL Facilities Department. The AE will also prepare Title I and II design and provide technical oversight during Title III construction. A Construction Management (CM) contractor will perform cost, schedule, and constructability reviews during design. Selection of the CM contractor during the design phases will be based on competitive bidding of the Construction General Conditions. The CM contract will have an option for management

[1] This cost estimate is based on conceptual data. The annual escalation rates assumed in the FY 2003 estimate for FY 2002 through FY 2006, are 2.6%, 2.8%, 2.8%, 2.9% and 2.9% respectively.

[2] Initial research equipment including testing and acceptance.

of the construction process. At the completion of design, the CM contractor will bid out the design to subcontractors. The University will have the option to proceed with the CM contractor or bid the project to a separate subcontractor. Construction subcontract(s) will be awarded on a competitive basis using best value source selection criteria that will include price, safety, and other considerations.

6. Schedule of Project Funding

(dollars in thousands)

	Prior Years	FY 2002	FY 2003	FY 2004	Outyears	Total
Facility Cost						
PED	0	38	5,972	1,290	0	7,300
Construction	0	0	0	16,660	59,740	76,400
Total, Line Item TEC	0	38	5,972	17,950	59,740	83,700
Other Project Costs						
Conceptual design cost	290	440	0	0	0	730
NEPA Documentation Costs	0	40	0	0	0	40
Other project-related costs[1]	120	30	0	0	380	530
Total, Other Project Costs	410	510	0	0	380	1,300
Total, Project Costs (TPC)	410	548	5,972	17,950	60,120	85,000

7. Related Annual Funding Requirements

(FY 2006 dollars in thousands)

	Current Estimate	Previous Estimate
Annual facility operating costs	$18,000	N/A
Total related annual funding (operating from FY 2006 through FY 2046)	$18,000	N/A

[1] Includes preconceptual data and documentation required for CD-1 and for commissioning and startup. Experimental research will begin at the time of beneficial occupancy of the facility. These experimental research costs are not part of the TPC and will be funded by the BES program.

8. Design and Construction of Federal Facilities

All DOE facilities are designed and constructed in accordance with applicable Public Laws, Executive Orders, OMB Circulars, Federal Property Management Regulations, and DOE Orders. The total estimated cost of the project includes the cost of measures necessary to assure compliance with Executive Order 12088A Federal Compliance with Pollution Control Standards, the Occupational Safety and Health Act of 1970, the provisions of Executive Order 12196, the Safety and Health provisions for Federal Employees (CFR Title 29, Chapter XVII, Part 1960); the Architectural Barriers Act, Public Law 90-480, and implementing instructions in 41 CFR 101-19.6. The project will be located in an area not subject to flooding determined in accordance with Executive Order 11988. The scientific research which will take place in this facility requires a unique research facility and location as described in Section 3.